

Clarification of Hermann H. Kunstler's botanical collecting localities in Peninsular Malaysia

Ruth Kiew

Forest Research Institute Malaysia,
52109 Kepong, Selangor, Malaysia
ruth@frim.gov.my

ABSTRACT. Kunstler's collections made in Gopeng, Perak, in 1880 had labels wrongly printed with 'Larut'; herbarium specimens from Ulu Bubong, Ulu Kerling, and Sungai Kul were wrongly localised as from Perak instead of from Selangor; 'G.M.' on Kunstler's labels from his 4th expedition to Gopeng in 1885, which included plants restricted to limestone, refers to Gunung Mesah south of Gopeng (not Gunung Megua or Gunung Malacca, names that do not exist, nor does it refer to Gunung Bujang Melaka, a granite peak south of Kampar, Perak); lastly 'near G.M.' probably refers to Gunung Tempurong, Perak. *Paraboea capitata* Ridl. and *P. vulpina* Ridl., both strict calcicoles, were not collected from G. Bujang Melaka as was reported by Ridley.

Keywords. Gopeng, Gunung Bujang Melaka, Gunung Mesah, Gunung Tempurong, limestone, Perak, Selangor, Ulu Bubong

Introduction

The first Flora to deal with Peninsular Malaysia was J.D. Hooker's seven volume *Flora of British India* (1872–1897) based on herbarium collections at the Royal Botanic Gardens, Kew, U.K., and Calcutta, India. However, owing to a paucity of herbarium specimens at that time the results are very incomplete. George King, Director of the Royal Botanic Garden Calcutta, therefore organised systematic botanical collecting in Peninsular Malaysia in order to enable him to undertake the first detailed and comprehensive *Materials for a Flora of the Malay Peninsula* (begun in 1889 and completed together with other botanists in 1936). He arranged with Sir Hugh Low, then British Resident at Perak, to employ plant collectors to make good this collections deficit. Between 1880 and 1886, Benedetto Scortechini, a Jesuit priest, and Hermann H. Kunstler, a German explorer from Australia, collected specimens that were sent to Calcutta with duplicates to Kew (Burkill 1927). For this reason many of the labels on Kunstler's specimens record him as 'King's Collector' rather than as Kunstler. The Singapore Herbarium later acquired a partial set of Kunstler's specimens. Kunstler's specimen labels are exemplary in the detail they give of characters that cannot be seen in dried herbarium specimens, as well as often providing information on habitat. He collected about 11,000 numbers, with many becoming the type specimen for a plethora of new species described as the flora of the Malay Peninsula was becoming

better known, including more than a hundred named in his honour, such as *Homalium kunstleri* King and *Plectranthus kunstleri* Prain, both species that he collected from limestone in Perak.

Kunstler's botanical collecting localities

With the patronage of Sir Hugh Low, Kunstler collected mostly in Perak, in the Larut and especially in the Gopeng district. The latter in his day was a centre for tin-mining, which had already resulted in extensive degradation by forest clearing and the silting of river systems, and where around Kuala Dipang the forest was being opened up for European plantations (Burkill 1927). Narayanaswami (1931) in his article on the *Provenance of Early Plant Collections* provided a useful itinerary of Kunstler's collecting trips based on information from his diaries and drew attention to some confusion about the exact location of Kunstler's collecting localities. Unfortunately, to date, there is no database of Kunstler's specimens making it difficult to directly trace his itinerary in detail. Narayanaswami's list was extracted from Ridley's five volume *Flora of the Malay Peninsula* (1922–1927) but Ridley, in reporting a species' distribution did not always provide a specimen number and/or precise locality, and in any case Narayanaswami's list is incomplete. Although Narayanaswami was based in the Calcutta herbarium, he does not appear to have consulted the first set of Kunstler's specimens there.

In spite of information provided by Burkill (1927) and Narayanaswami (1931), inaccuracies continue to appear in the literature concerning the localities where Kunstler collected. Three sources of error are clarified below.

1. Labels printed 'Larut' that were collected from the Gopeng District

Narayanaswami (1931) has drawn attention to the labels for Kunstler's specimens collected from the Gopeng District between August and December 1880 being mistakenly printed 'Larut' in Calcutta, although the actual collecting locality is clearly written on the label.

2. Specimens collected in northern Selangor but recorded as from Perak

Narayanaswami (1931) reported that Kunstler in January and between March and August 1886 'crossed the borders of Perak and wandered in Northern Selangor'. However, the herbarium labels, while clearly providing the correct locality (Table 1), placed them in Perak and not Selangor. Unfortunately, this correction has been overlooked and the majority of botanists still cite these localities as in Perak, not in Selangor.

Narayanaswami (1931) is correct in surmising that Kunstler's locality 'near K.L.' is probably between Ulu Bubong and Ulu Selangor because, for example, *Codonoboea pectinata* (Oliv.) Kiew (*Kunstler 10711*) recorded from 'near K.L.' is hyper-endemic to

that part of the Main Range. The herbarium label records *C. pectinata* from limestone, but it is in fact a calcifuge species. This is the single instance of inaccurately recorded rock type.

Table 1. Kunstler's collecting localities in northern Selangor frequently incorrectly cited as being in Perak.

<i>Locality</i>	<i>District</i>	<i>Latitude and longitude</i>
Ulu Bubong	Hulu Selangor	3°31'N 101°43' E
Ulu Kerling	Hulu Selangor	3°35'N 101°36' E
Sungai Kul ¹	Hulu Selangor	3°35'N 101°45' E

¹often written by Kunstler as Kal. For current correct names and spelling of botanical collecting localities see Hamidah et al. (2011).

3. Location of Kunstler's limestone collecting localities

Even more confusion has arisen over Kunstler's collecting localities from limestone hills in Perak. There are at least 45 limestone hills in the Kinta valley presently named on topographical maps (Malayan Nature Society 1991). However, Kunstler did not name specific hills on his specimen labels but instead noted the area where they occurred, such as Kinta, Gopeng, and Kuala Dipang (which he spelt Goping and Kwala Depang, respectively). Perhaps because he could obtain the name of a river or village from local people, the two exceptions were Sungai Raia, which he variously spelt as Sungei Raia, Rayah, Ryah, Ryoh, and Gunung Mesah (4°26'N 101°10'E), spelt Meusah on older maps. Sungai Raia rises in the Main Range and flows east past Gunung Datoh (4°36'N 101°09'E), a limestone karst hill, then southwest to the confluence with Sungai Kinta near Batu Gajah (Malayan Nature Society 1991) while Gunung Mesah, which is a few miles south of Gopeng, is the site of a Malay village. Incidentally he never used 'Ipoh' as a locality. (In his time Ipoh was a village at the highest navigable point on the Kinta River. Ipoh only developed into a town in the early twentieth century when the British Tin-mining Company, followed by several banks, were established there).

Burkill (1927) reported that Kunstler set up his headquarters in Gopeng (4°28'N 101°10'E), which is an area rich in limestone hills. Altogether he made four expeditions in the Gopeng area and since he was careful to specify soil type, the plants from limestone can be identified. Henderson (1939) noted that Kunstler, or the clerk transcribing labels, consistently spelt limestone as 'limbstone' or shortened it to 'limbs' or 'limbs hills', occasionally giving 'Limbo Hills' as the locality. In addition, in most cases it is possible to use the label data of species known to be restricted to limestone substrate to check whether the locality recorded is limestone or not.

1st Expedition to Gopeng, Kinta District, in 1880

(From Narayanaswami's incomplete list, Kunstler's collecting numbers run from at least 449 to 985).

<i>Months:</i>	<i>Locality:</i>
August–September, November	Gopeng
October	Sungai Raia

This first expedition included several species restricted to limestone, such as *Monophyllaea hirticalyx* Franch. (Kunstler 449) and *Paraboea capitata* Ridl. var. *oblongifolia* Ridl. (Kunstler 456) from Gopeng; *Monophyllaea elongata* B.L.Burt (King's Coll 674) from Kinta; *Paraboea capitata* var. *capitata* (Kunstler 978) and *Epithema saxatile* Blume (Kunstler 983) from Sg. Raia; and *Saprosma glomerulatum* King & Gamble (Kunstler 783) and *Thunbergia laurifolia* Lindl. (Kunstler 1064) from G. Mesah.

2nd Expedition to Gopeng, Kinta District, in 1883

(From Narayanaswami's incomplete list, Kunstler's collecting numbers run from at least 4177 to 4814).

<i>Months:</i>	<i>Locality:</i>
June–August	Gopeng

The second expedition included hills to the north of Gopeng, probably around Gunung Rapat (4°34'N 101°08'E). Apparently few limestone species were collected, but he did, however, collect *Paraboea capitata* var. *capitata* (King's Coll. 4325) from Sg. Raia at this time.

3rd Expedition to Gopeng, Kinta District, in 1884

(From Narayanaswami's incomplete list, Kunstler's collecting numbers run from at least 5872 to 6031).

<i>Months:</i>	<i>Locality:</i>
April–May	Gopeng

The third expedition collected plants from the east of Gopeng from the Chenderiang area and included a few limestone plants, such as *Epithema saxatile* (Kunstler 5872).

4th Expedition to Gopeng, Kinta District, in 1885

(From Narayanaswami's incomplete list, Kunstler's collecting numbers run from at least 7026 to 7222 for specimens collected from Gopeng, and 8130 to 8424 for specimens collected around Kuala Dipang and Sungai Siput Selantan).

<i>Months:</i>	<i>Locality:</i>
January	Gopeng, 'G.M.', Gunung Mesah
September–October	Kuala Dipang/Sungai Siput Selantan

The last expedition visited Kuala Dipang (4°23'N 101°10'E), which is a village southeast of Gopeng. Many collections from limestone were made, such as *Plectranthus kunstleri* Prain (*King's Coll.* 8240), *Paraboea caerulescens* (Ridl.) B.L.Burt (Kunstler 8276) and *Paraboea paniculata* (Ridl.) B.L.Burt (Kunstler 8271).

It was from this expedition that the confusion of the identity of the locality written as 'G.M.' originates. Narayanaswami (1931, pg 329) mistakenly supposed it to be Gunung Bujung Melaka, writing that in January 1885 Kunstler 'went to Gunung Bujung Malaka (sometimes written as G.M. and mistaken for Gunung Mesah)' even though labels bearing 'G.M.' clearly state the plants are from limestone. It is likely that Narayanaswami was not aware of the different geology of the two hills: Gunung Bujung Melaka (4°20'N, 101°12'E, old spelling Gunung Bujung Malacca) is a granite peak on the Main Range just outside Kampar; while Gunung Mesah is a limestone tower karst hill south of Gopeng.

The issue has been further confused because Ridley in his Flora interpreted 'G.M.' as 'Gunong Malacca', a place name that does not exist on maps. That his Gunong Malacca is a limestone hill is seen by his recording Kunstler's specimens of *Impatiens alboflava* Miq. (Kunstler 7057) and *Sonerila elliptica* Stapf from 'limestone rocks in Perak, Kinta District'. However, some specimens such as *Strobilanthes pachyphylla* C.B.Clarke (Kunstler 7150) he did record as from 'Gunung Meusah, Kinta'.

This error that 'G.M.' was Gunung Bujung Melaka was repeated by Steenis-Kruseman (1950) and Burt (1978). However, one way to solve the provenance of these G.M. specimens is to check whether they are plants that grow on limestone or granite. For example, *Monophyllaea elongata* is a species restricted to limestone. Burt (1978), who described this as a new species, drew attention to *King's Coll.* 7052 where the label recorded that it was collected from 'Kinta, near G.M.' and 'has pencilled alongside the G.M of the label "Gunong Magua"?' It is not known who wrote Gunong Magua (perhaps a clerk?), because the handwriting does not correspond to any botanists' handwriting who has studied Malaysian plants. However, Gunung Magua does not exist as a place name. Burt followed Narayanaswami's conclusion that it was Gunung Bujung Malaka. This is certainly an error because *Monophyllaea elongata* has an extremely restricted distribution and is confined to limestone substrate.

Another specimen that Ridley (1923) localised as from 'Kinta, Gunung Megua' was *King's Coll.* 7191 that he identified as *Didissandra glabrescens* Ridl., now considered as a synonym of *Ridleyandra atrocyanea* (Ridl.) A.Weber, and that is known only from granite substrate, never from limestone, and for which Ridley (1923) gave its locality as 'Bujung Malacca'. In this instance Weber (1998) is correct in thinking that G.M./Gunong Megua 'certainly means Gunung [Bujung] Melaka'.

Gunung Mesah was revisited to check if the plants recorded from 'G.M' or 'near G.M.' grow on this limestone hill. Although the surrounding forest has been cleared for village orchards, agriculture and fish farms, the hill itself is relatively untouched. A Chinese temple that occupied the cave has been abandoned. Fortunately the hill has been spared from quarrying, unlike Gunung Panjang, the next small hill to the south that is already half consumed by an active quarry. Gunung Mesah is a relatively low hill reaching 262 m altitude and the summit, although craggy, is covered by a deep leaf litter layer that supports a complete tree canopy with *Hopea bilitonensis* P.S.Ashton as a dominant species. Without a database of Kunstler's specimens, it is difficult to extract a complete list of plants that he collected. However, three that Kunstler had collected there were recollected after an interval of 125 years, namely *Thunbergia laurifolia* (Kunstler 1064), *Paraboea capitata* var. *oblongifolia* (Kunstler 456), and *Monophyllaea hirticalyx* (Kunstler 449).

Notable is a group of species collected by Kunstler in January 1885 that were recorded as from 'near G.M.' but were not refound on G. Mesah. These include species, such as *Callicarpa angustifolia* King & Gamble (Kunstler 8236), *Homalium kunstleri* King (Kunstler 7109), *Paraboea caerulescens* (Kunstler 7062, 7175), and *Paraboea parviflora* (Kunstler 7108), that grow on exposed summits of limestone hills where the trees are stunted and the canopy is open. This habitat is found on the summit of Gunung Tempurong (4°25'N 101°12'E), the highest limestone karst in Perak that reaches 611 m altitude. In addition, it is one of the two localities from which *Paraboea parviflora* is known. *Monophyllaea elongata* (King's Coll. 7052) is another hyper-endemic species that is known only from Gunung Tempurong, where it grows in abundance on damp, vertical rock faces around the base of the hill, where a river runs out of the cave. Such a habitat does not exist on Gunung Mesah.

Gunung Tempurong houses the largest cave in Peninsular Malaysia so it was surely known to local people, who could act as guides. However, the name Gunung (Mount) or Gua (Cave) Tempurong was not cited as a collecting locality by Kunstler, C. Curtis nor Ridley, nor it is mentioned by Burkill (1927). However, the present distribution of these hyper-endemic species, and their exacting habitat requirements, leads to the conclusion that Kunstler's locality 'near GM' refers to G. Tempurong.

One enigma remains, namely from where *Paraboea capitata* was first collected. Ridley described *Paraboea capitata* from a specimen collected by Curtis (Curtis 3215) in December 1895 that gave 'Bujong Malacca' as its provenance in spite of it being a strict calcicole. This is likely due to a simple error caused by a mix up of specimens because in December 1895 Curtis had collected both on limestone hills in Ipoh and Kuala Dipang as well as on Gunung Bujang Melaka (Burkill 1927). (Later in the Penang Botanic Gardens, Curtis grew plants from this gathering that he also supplied to Ridley who described them as new species, *Paraboea curtisii* Ridl. and *P. polita* Ridl., in spite of the specimens having the same collecting number, Curtis 3215. They are now both synonyms of *P. capitata* var. *capitata*). Subsequent collections show that *P. capitata* var. *capitata* is quite common on limestone hills around Ipoh town but since Curtis did not number his specimens in a strict sequence, it is not possible to know exactly where he collected Curtis 3215. Ridley (1923) described *P. vulpina*

Ridl., another strict calcicole, from a collection from the Hot Springs in Ipoh (*Curtis 3132*), which is a limestone locality, as well as recording this species from 'Bujong Malacca' but without citing the collector. However, this latter specimen has never been found and until about 20 years ago this species was known only from a limestone hill at the Hot Springs, Ipoh (Burt 1984). In this case too, it is clear that 'Bujong Malacca' is a mistake.

Conclusion

Until a complete database for the specimens that Kunstler collected becomes available, it is not possible to track his itinerary in detail. Many of Kunstler's collections are type specimens or are of rare species, several of which have not been recollected. Being able to pinpoint his collecting localities has implications for taxonomy and conservation because it would allow a search of these places to enable the collection of complete material of problematic species and assessment of their conservation status. This is because, in the intervening 125 years, many of his collecting localities are likely to have become degraded and their habitats may no longer exist having been replaced by tin-mines or plantations.

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